Latest developments in 3D analysis of geomaterials by Morpho+

L. Brabant*, J. Vlassenbroeck*, V.Cnudde, Y. De Witte*, M. Boone*, J. Dewanckele**, L. Van Hoorebeke*, P.Jacobs** .**

** Department of Subatomic and Radiation Physics, Ghent University, Proeftuinstraat 86, B-9000 Ghent, Belgium*
loes.brabant@ugent.be
jelle.vlassenbroeck@ugent.be
yoni.dewitte@ugent.be
matthieu.boone@ugent.be
luc.vanhoorebeke@ugent.be

***Department of Geology and Soil Science, Ghent University, Krijgslaan 281/S8, B-9000,Ghent, Belgium*
veerle.cnudde@ugent.be
jan.dewanckele@ugent.be
patric.jacobs@ugent.be

ABSTRACT. At the Centre for X-ray Tomography of the Ghent University (UGCT), a flexible software program has been developed (Morpho+) for 3D analysis of CT data. A lot of adjustments have been made to implement features in Morpho+ which are useful for the analysis of geomaterials. It is possible to calculate the porosity, or density, of the total sample, as well as partial porosity in a longitudinal or radial direction. In order to examine the connectivity of the pore network the Euler number can be determined and the size and position of the bottlenecks can be calculated. There are several parameters to determine the size and shape of pores or grains such as: the surface, the diameter of the maximum inscribed sphere, the diameter of the minimum circumscribed sphere and the equivalent diameter. Comparison of these parameters allows to determine the sphericity of the grains or pores. Morpho+ produces a quantitative output, but it is also possible to visualize the different steps of the analysis, which enables easy interpretation of the results. For example 3D volumes of the scanned grains can be color labeled based on their size, or the volume can be saved as an STL-file. Additionally it is possible to create a skeleton of the pore network.

KEYWORDS. 3D analysis, X-ray CT, geomaterials, Morpho+, high-resolution